

## **APPENDIX 8**

### **LAND USE HISTORY FOR THE GUALALA RIVER WATERSHED**

Located immediately north of the Bay Area, the Gualala Watershed has the longest span of historical use compared to other North Coast Watersheds. Logging of the virgin old growth redwood forest began during the mid 1800s. The first documented account dates to 1862 in lower portions of the watershed near coastal ramp and port facilities. There was concentrated demand of the resource after the 1906 earthquake and rebuilding of San Francisco. A rail line extended along the South Fork to Gualala from the Santa Rosa Area.

The first logging methods used oxen teams to move large old growth redwood logs to terminal points of lateral connecting raillines. Watercourses were frequently used as skid paths to move logs downslope. Natural pool structure was removed during construction and use of watercourses as skid ramps. Log planking of the streambed was commonly used to ease frictional constraints. Construction of splash dams represented a significant alteration of stream channel morphology. These activities undoubtedly left many areas vulnerable to major erosional impacts by infrequent large storm events.

Lateral raillines extending to the interior had to be built on a low elevation rise following an even sideslope contour. This necessitated massive cut and fill excavation operations by a mobile train mounted steam shovel. These worked at the endpoint of the newly constructed railline. Although wood trestles were built over larger watercourses, smaller watercourses were crossed by wood and earth fill. This frequently dammed the watercourse over time, and failed altogether. Many sections of the lateral raillines continue to be used today as part of the current permanent and seasonal road network with watercourse crossings upgraded and repaired.

The introduction of the stream donkey by the turn of the century reduced ground impacts by cable pulling large logs from fixed locations. Elaborate pully systems enabled cable winching over larger distances. These operations did not disturb the ground to the extent of more recent tractor operations characterized by large scale slideslope excavations and skid trail networks.

The gasoline powered crawler tractors made their appearance in the northcoast in the late 1920s. At first, these were slow, limited to near level terrain, and subject to repeated breakdowns. Steam donkey methods continued to operate on moderate to steep terrain. However, refinement of military tank designs during World War II immediately transformed tractor yarding equipment as reliable and economical timber harvesting methods. Improvements in transmission, suspension, and engine horsepower in the Russian built T-34 tanks and German Mark III Panther tanks in the early 1940s enabled heavily armored equipment to rapidly move over varied terrain. The development of the diesel engine, built into the Mark VI King Tiger Tank, powered even heavier loads. Early versions of the D-8 and D-10 tractors, using the same track mounts and suspension systems, and powered by diesel engines, were ideally suited for moving large diameter logs over difficult terrain. This equipment was readily maneuverable, enabling large areas to be worked over in short time periods. Rail line networks were quickly abandoned to diesel powered log trucks operating along seasonal roads.

The 1936 photos show the Gualala Watershed long dormant during the Great Depression. The mid sized second growth stands shown in these photos indicate that old growth logging by steam donkey had ceased shortly after the turn of the century. There are no interior logging roads away from the coast. This indicates that the old railline network was unused and abandoned during the Great Depression.

Increased demand for lumber products during the 1950s coincided with the widespread deployment of D-8 and D-10 sized heavy tractors throughout the watershed. By 1952, an ample timber supply consisted of larger diameter second growth redwood regenerated from mid 1800 old growth era harvesting, and old growth Douglas-fir in central and upslope locations.

Between 1952 and 1960, tractor method harvesting extended in a broad sweep from the upper reaches of the North Fork, east through the central and upper reaches of Rockpile and Buckeye Cks, and throughout lower and middle reaches of Wheatfield Fk. Harvest operations followed straight parcel lines irregardless of watercourse condition or

difficult terrain. Roads often followed the stream channel to enable downslope skidding. Many roads had steep gradients designed to access all positions of the sideslope. Skid trails frequently followed or crossed ephemeral stream channels. Landings were often located in or adjacent to watercourses. These were built by pushing wood debris into channel, and overtopped by dirt fill. Across steep terrain, skid trails cut deep into the sideslope, creating a terraced effect.

By 1964, tractor harvesting had continued at an active pace to comprise a majority and in some areas, most of the timbered areas in the west and central reaches of the watershed. In the mixed conifer –oak woodland areas in the north east and east areas of the watershed, a considerable portion of the original Douglas-fir stands had been harvested. These had occupied north slopes and riparian areas on private ranch parcels. Prolonged cattle grazing in these areas after harvest prevented timely reestablishment of canopy cover over fish bearing watercourses, elevating stream temperatures.

The lack of any erosion control facilities installed throughout large areas of the watershed, coupled with the uncontrolled installation of fills and failure to remove fills adjacent to watercourses, left the entire watershed particularly vulnerable to the 1964 flood event. During a period of one week in December 1964, the intense prolonged runoff caused massive erosion downcutting, slides, and washing of soil and debris into watercourses by which essentially characterizes sediment loads and aggregation points still observed today. The June 1965 Cal Trans photos taken at 1200 scale clearly show repeated stream channel meandering patterns through wide, flat areas of buried stream pools. This indicates deep channel aggradations. Roads following the stream channel repeatedly failed as fill sidecast washed out during peak flows. Debris slides above and below roads were frequent. Deep blow outs through landings built over channel are numerous throughout the 1965 photos. There were frequent watercourse diversions onto roads and skid trails. Although the U.S. Geological Survey cumulative peak flow gauge along the lower South Fork shows 1955-56 cumulative flows slightly higher than 1964-65, far fewer areas of the watershed were logged by 1955 compared to 1964 (See Logging History Maps). .

After 1964, harvest operations resumed at an active rate in the lower and middle reaches of the North Fork and entire Little North Fork areas to remove most of the available timber base in these areas by 1973. Other areas of mature Douglas-fir in (1) higher elevation areas and (2) east reaches of the watershed, were harvested during this time. Only pocket stands and scattered larger timbered blocks remained. Road and landing locations continued to be located low on the sideslope, frequently following the stream channel. Subsequent landing blowouts and road failures have been documented along the Little North Fork and central North Fork. There were large storm events in 1972 and 1975.

After 1973, logging operations had slowed. Smaller selection method harvests were predominant. By this time, tractor yarding methods changed to maintain equipment exclusion zones and minimum vegetation retention standards adjacent to watercourses per 1973 Forest Practice Rules. New road locations were moved upslope. The new forest practice rules limited the cutblock size, creating smaller logged areas.

In the 1990s, harvest activity increased. Smaller but numerous clearcut blocks appear in the redwood lowland areas of the Gualala Redwoods ownership. Throughout the watershed, cable method yarding appears with new road construction now moved to upslope and ridgeline locations. Many sections of the older seasonal roads following the stream channel are either abandoned or removed. During the mid 1990s, Coastal Forestlands (formerly R&J Timber Co.), purchased by Pioneer Resources in 1998, submitted numerous seed tree overstory removal/ dispersed harvest THPs, covering large areas but removing scattered single trees and remnant stands left from 1960s era entries. Agency review of these THPs clarified road upgrade work requirements to repair erosion conditions of pre-1973 operations. There has been little harvesting in these areas since 1998. 95% of the entire Gualala watershed is privately owned (see Ownership Distribution Map, pg ).